Error Metrics and Performance Fitness Indicators for Artificial Intelligence and Machine Learning in Engineering and Sciences

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Abstract

Artificial intelligence (AI) and Machine learning (ML) train machines to achieve a high level of cognition and perform human-like analysis. Both AI and ML seemingly fit into our daily lives as well as complex and interdisciplinary fields. With the rise of commercial, open-source, and user-catered AI/ML tools, a key question often arises whenever AI/ML is applied to explore a phenomenon or a scenario: what constitutes a good AI/ML model? Keeping in mind that a proper answer to this question depends on various factors, this work presumes that a goodmodel optimally performs and best describes the phenomenon on hand . From this perspective, identifying proper assessment metrics to evaluate the performance of AI/ML models is not only necessary but is also warranted. As such, this paper examines 78 of the most commonly-used performance fitness and error metrics for regression and classification algorithms, with emphasis on engineering and sciences applications.